

GAUHATI UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE  
AND INFORMATION TECHNOLOGY

PROJECT REPORT: PHASE 1

project title: **one sample per person facial recognition system**

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**AIM of the project:** To develop an application software which uses only one single face image of a person so later it can identify the person.

**Abstract:** There are various methods in face recognition system, however most of them uses more image samples and some of them focuses on using single image sample, but it's a daunting task when it comes to accuracy of the system, and most of the technique failed to solve one sample per person problem. In computer vision the one sample per person problem is – a program has to identify a person face in an image by using one face sample of that person. In this report some methods are discussed to achieve the AIM of the project.

### **Methods:**

There are two main phases of the system.

1. Training phase
  - 1.a) Face detection
  - 1.b) Preprocessing
  - 1.c) training
2. Testing phase
  - 2.a) Input image
  - 2.b) Preprocessing
  - 2.b) Predict

### **1. FACE DETECTION**

### **2. PREPROCESSING**

### **3. FACE RECOGNITION**

Feature extraction: After detecting a face and preprocessing, the feature can be extracted. There are various types of feature can be extracted, still LocalBinary Pattern (LBP) feature is known to be best in solving one sample per person problem. Also more than one feature can be used too. For now LBP is discussed as follow-

LOCAL BINARY PATTERN(LBP): The algorithm

- 1.Convert the Image to Gray scale
- 2.Select a pixel(central pixel)which has 8 neighbors pixel as at top left, top, top right, left, right , bottom left, bottom,bottom right.
- 3.Starting from the top left pixel to left pixel as clock wise direction , if the neighbor pixel intensity is greater than or equal to the central pixel intensity then store 1 otherwise store 0 at 0<sup>th</sup> position of a 8 bit binary number and do this until 7<sup>th</sup> position is completed and then calculate the corresponding decimal number and store it in a new image at the pixel position similar to the central pixel position.
- 4.Do 2 and 3 , until no more pixel has 8 neighbors.

Example:

40	30	25
50	35	20
60	70	80

Central  
pixel

Intensities of 9 pixels

1	0	0
1		0
1	1	1

0<sup>th</sup> bit

7<sup>th</sup> bit

11110001

Binary pattern

LBP weight

241

Tools and programming language :

compiler : GCC

programming language : C++

Image processing libraries: Intel Integrated Performance Primitives (IPP), OpenCV

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